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Testing local DNA stiffness by nanoconfinement ALENA KARPUSENKA, ROBERT RIEHN, North Carolina State University — The primary intent of this work is the study of DNA movement inside curved nanochannels. In particular, we considered channels with a cross-section smaller then the DNA persistence length, and channel length far beyond the contour length of the molecule. This allows us approximation of the polymer with the model of an elastic rod (Odijk model). We are testing the local DNA stiffness by bending the molecule in curved channels, and a bending energy landscape is constructed by comparing forces due to bending stiffness to known electrophoretic forces. To estimate the limiting radius of nanochannel curvature permeable for DNA molecules at a given driving force, two sets of nanochips were fabricated. The first set of nanochannels is formed by the sequence of semi-circumferences with descending radius (20 μm to 50 nm) and tests moderate bending of a set of length scales. A second set of nanochannels is shaped as a zigzag of constant steps, and tests local bending stiffness.

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